Canadian Centre for
Occupational Health
and Safety

Centre canadien
d'hygiène et de
sécurité au travail

The Centre and Occupational Health and Safety Problems in Canada

P86-2E

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by
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Canadian Centre
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THE CENTRE AND OCCUPATIONAL HEALTH AND SAFETY PROBLEMS IN CANADA

CCOHS NUMBER P86-2E

ISBN 0-660-12070-4

DSS CATALOGUE NUMBER CC273-2/86-2E

This publication is available
in both official languages.

Cette publication est disponible
dans les deux langues officielles.

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Published 1986

Additional copies available upon request.

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CONTENTS

SECTION	CONTENT	PAGE
1	**Introduction**	1
2	**Problems in Occupational Health and Safety in the Mid-1980's**	2
3	**Rationale for Government's Role in Occupational Health and Safety**	4
4	**Occupational Health and Safety in Canada: Strategies and the Strategic Nature of Information**	7
4.1	The Question of Jurisdiction	7
4.2	The Nature of Strategies	9
4.2.1	Making and Enforcing the Law	10
4.2.2	Discovering Problems and Solutions	11
4.2.3	Creating the Cadre	13
4.2.4	Promoting Action	14
4.3	The Strategic Nature of Information and Advice	15
5	**The Role of the Centre**	18
5.1	Expectations for the Centre in 1978	18
5.2	Concerns For and About the Centre	19
5.3	The Picture of the Field of Occupational Health and Safety in which the Centre was to Operate	20
5.4	The Centre's Functions as seen in 1978	21
5.5	The Centre in 1984	22
5.6	The Centre's Future	23
6	**Conclusion**	25
	Figure 1 Canada Fatalities	26
	Figure 2 Canada: Injury Frequency Rates, per hundred workers	27
	Figure 3 Canada: WBC Costs in 1971 Dollars	28
	Appendix 1 The Status of Systems for Collecting OHS Statistics in Canada and the Prospects for a Canadian System	29
	Appendix 2 Public Letter from Dr. J. Donald Millar	32
	Appendix 3 Occupational Health and Safety from a Government Perspective	34
	Appendix 4 Current Occupational Health and Safety Research in Canada	35

Canadian Centre
for Occupational Health
and Safety

CONTENTS

SECTION	CONTENT		PAGE
	Appendix 5	Secondary School	39
	Appendix 6	The Future of Occupational Health	41
	Table 1a	Ontario: Number of Compensation Claims by Nature of Injury	42
	Table 1b	Ontario: Compensation Claims with Costs by Nature of Injury - Benefits Paid Out	42
	Table 1c	Costs of Governments Activities in OHS, through the Ministry of Labour, excluding Compensation Boards and their Activities	43
	Table 1d	Operating Statistics OSH Regulatory Agency Operations 1984-85 Federal-Provincial	44
	Table 1e	Person-Years and Costs, OHS Regulatory Agencies	45
	Table 2	Analysis of Strategies and Policies	45
	Table 3	The Number of Agencies Involved in and Laws Dealing with Occupational Health and Safety in Canada 1982	46
	Table 4	Occupational Health and Safety in Canada Departments and Legislation	47

1. Introduction

In March of 1984, the Program Evaluation Committee set up by the Canadian Centre for Occupational Health and Safety called for a background paper with these terms of reference:

> "The extent, the nature, and trends of occupational health and safety problems and their related costs; the strategies in the private and public sector to deal with these problems; the extent of complementarity, duplication and/or gaps between different jurisdictions and organizations in responding to the occupational health and safety problems; the status, role and orientation of the Centre in relation to those strategies."

This report was prepared to brief the Program Evaluation Committee, and the consultants who carried out the evaluation, about the world of occupational health and safety (OHS) in which the Centre must operate. The report focusses on information because the Centre focusses on information. To that end, the report highlights problems which have a particular influence on the way the principal participants in occupational health and safety might see the Centre.

Some of the specific objectives in the terms of reference cannot be attained easily, if at all, because of the lack of comprehensive and consistent data on occupational health and safety in Canada. Existing data do not permit an analysis of 'the extent, the nature, and trends of occupational health and safety problems' except at the most general of levels. Data are not available on costs because cost elements are yet to be defined, something attempted in this report, as preparation for the considerable effort needed to measure them. Existing documentation, such as the Centre's report, *A Mosaic of Mosaics*[1], is not extensive enough to provide the basis for an adequate review of 'the extent of complementarity, duplication and/or gaps between different jurisdictions and organizations in responding to the occupational health and safety problems'. Although it is possible to identify to some extent the ways in which the private and the public sectors have tried to deal with these problems, a fundamental question not raised in the terms of reference is that of what mix of strategies is the most effective.

Underlying the terms of reference are the assumptions that statistical programs in Canada are sufficient and that there is an adequate body of analytical and evaluative work to be drawn on in order to deal with the fundamental issues raised in the terms of reference. These assumptions are inaccurate; indeed, one of the key issues in the 1980s is the weakness of statistical data and of analytical and evaluative work for assessing programs and policies.

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[1] A Mosaic of Mosaics : a report on occupational health and safety in Canada. (CCOHS publication). Hamilton : CCOHS, 1983

1. Introduction *continued*

In the report, such gaps in knowledge are identified, as are certain current problems associated with them. The shortcomings of this report in meeting its terms of reference highlight the importance of the Centre's information work. Important data are not available because information in occupational health and safety has not been accorded sufficient strategic importance or practical effort. If we could not obtain the data we needed for this report, governments, employers, labour and others must face the same information shortfall, but without necessarily being able to trace what does exist because they might not have the resources available to the Centre.

The report touches on parts of occupational health and safety which are controversial. It was prepared through a succession of drafts, each submitted to commentators inside and outside the Centre. Commentators responded strongly not only to the report, but also on the material added as a result of others' comments. For that reason, sections and comments have been included as perspectives attributed to commentators.

2. Problems in Occupational Health and Safety in the Mid-1980s

Problems[2] which OHS seeks to address include disease, injury, and death associated with occupation; their causes; and concerns, conflicts, and situations in need of resolutions. The field of problems expands, and important disparities exist in interpretation of causes, trends, costs, solutions, and resolutions.

Weiler's analysis of trends in workers' compensation claims suggests that occupational disease appears today as a relatively small but growing problem: of 411,476 claims allowed by Ontario's Workers' Compensation Board in 1980, only 7,611 (fewer than two per cent) were for occupational disease. However, most occupational disease lacks characteristics which allow individual cases to be labelled as occupational or non-occupational with any degree of confidence. Indeed, occupational disease could in time be acknowledged as showing the same trends as disease in society as a whole, with cancer and heart disease dominating mortality statistics. More occupational contributors to carcinogenesis are being identified, as are connections between work-related stress and heart disease.

The figures on occupational injuries (see Figures 1, 2, and 3) show a slight upward trend in which disabling non-fatal injuries are increasing; fatal and non-disabling injuries, decreasing; costs of compensation *and* of prevention, rising. A report by the Metropolitan

[2] This section relies chiefly on Paul C Weiler's Protecting the worker from disability : challenges for the eighties. Ontario : Government Bookstore, 1983, and Terence G Ison's Workers' compensation in Canada. Toronto : Butterworths, 1983.

2. Problems in Occupational Health and Safety in the Mid-1980s *continued*

Toronto District Health Council[3] stated that Metropolitan Toronto's workforce of 1.5 million sustained accidental injuries and illnesses which, in 1982, incurred $205 million in direct costs for medical aid, rehabilitation, pensions and compensation; and estimated that a further $600 million was incurred in indirect expenses, such as lost productivity, as a result of work-related problems. A further insight into costs is conveyed by Table 1(a)-(d).

Occupational injuries appear to resist effectively such preventive strategies as have been tried, but strategies suffer fashions; the comparative studies needed to say what would have happened otherwise are lacking. We do not have the information to say what needs to be done to reverse the trend; see Appendix 1 and 2.

Costs associated with workplace injury and illness include losses in production as well as compensation and prevention. They are incurred by workers, employers, and society as a whole. They are economic as well as human and social, and although there are some corresponding benefits, costs must overshadow benefits if human suffering is involved.

The costs to workers of failed OHS strategies are loss of life, health, limb, and earning power; workers' chief concerns centre on personal security and protection. Benefits to workers of successful OHS strategies come directly from protection of life, health and bodily integrity, and indirectly from avoidance of costs and concerns.

The costs to employers of failure in OHS strategies include WCB and other payments, for example some proportion of taxes. A significant part of these costs go as benefit to the various elements of the OHS 'industry' which consists of government departments, prevention associations, universities and colleges, consultancies, lawyers, physicians, other professionals, scientists, and a sector of the communications industry, as well as the Centre itself. Some people question the value for money of the OHS industry as a strategy for prevention.

Costs to employers also include labour-management conflicts and loss of production arising out of OHS--costs generally not associated with any benefit to anyone. Costs to employers of prevention, however, bring benefits such as the opportunities for innovation which tough OHS legislation historically has presented, not always at the expense of reduced production or impaired profits. But changes will only be adopted if employers see them as a better way of doing things. Otherwise, costs of compensation will simply be accepted as the price of doing business. Employers' chief concerns center on spiralling costs, especially of WCB payments, and of over-regulation

[3] Workplace health and safety in Metropolitan Toronto. (Metropolitan Toronto District Health Council publication). Toronto : MTDHC, 1984

2. Problems in Occupational Health and Safety in the Mid-1980s *continued*

by government. Consequently, employers' preventive strategies increasingly appear aimed at controlling the costs of OHS--an objective which is not necessarily the same as eliminating dangerous or unhealthy working conditions.

For society as a whole, the burden of higher taxes sometimes benefits the country's competitors; the cost of higher prices sometimes benefits sectors of society differentially; the cost of services purchased elsewhere (for example, computerized information from the USA) seems to bring immediate benefits, although such services may in the long term damage by dependency. Society's concerns reflect an unease that government and industry are not effectively protecting workers and the public.

This brief inventory raises a number of difficult questions. How far should we be influenced by dollar costs when human life, health and limb are at stake? What constitutes value for money? What is the source of cost pressure? What alternatives are there to rising costs? How likely are additional expenditures in the name of prevention to reverse this trend? What would really happen, in the short and long term, if prevention succeeded? And can we really measure the economic impact of legislation?[4]

3. Rationale for Government's Role in Occupational Health and Safety

In thinking about these questions, it is useful to begin by stepping back to consider the rationale for the involvement of government agencies in OHS. An economist provides the following observations, which are quoted directly.

"From a public policy perspective, a useful starting point in addressing the need for government intervention in a specific area of endeavour begins with posing the following question: will the operation of private markets--the actions and interactions of the relevant parties in the market place--produce a result that represents an optimum from society's viewpoint? Here, the optimum represents a situation where resources have been allocated to an activity up to the point where the value of the expenditures on the activity is equal to the value of the benefits derived from the activity. As long as the value of the benefits that accrue to society from increasing an activity are greater than the value or cost of the additional expenditures, additional resources should be allocated to the activity. Within occupational health and safety, the optimum represents a situation where the benefits derived by society from activities to improve occupational health and safety are equal to the cost of the resources allocated to these activities. As long as the benefits to society of activities to reduce

[4] On this last point, see Manga, P.; Broyles, R.; Reschenthaler, G. B. Occupational health and safety : issues and alternatives (Technical Report Series No 6). Ottawa, Ontario : Economic Research Council, 1981

3.
Rationale for Government's Role in Occupational Health and Safety
continued

hazards outweigh the costs, additional resources should be allocated to these activities.

"The conditions required for private markets to generate a social optimum are very rigorous. For example, two necessary conditions are that the parties in the market place will act in a perfectly rational manner, and that decisions will be taken on the basis of full and perfect information. Another condition imposed by the latter requirement is that perfect information is freely available, that is, there is no cost associated with obtaining it.

"Under those circumstances, workers would be fully aware of the hazards to which they are being exposed in different occupations and would act rationally by demanding appropriate wage premiums to compensate for the risks[5]. Further, employers would finance activities to reduce hazards up to the point where the benefits derived from hazard reduction are equal to the costs of activities to reduce hazards, that is, an optimum would be attained and the costs of activities to reduce hazards would be reflected in the final prices of products and services in the market place.

"For those hazards that fall in the range where costs of prevention outweigh the benefits, employers could opt for insurance policies to cover the potential liabilities and, thereby, workers who are injured because of these hazards could be reimbursed for their pain and suffering, and loss of income.

"In reality, the necessary conditions do not exist for private markets to generate an optimum, that is, a situation where resources have been allocated to hazard reduction activities up to a level where the benefits generated from these activities are equal to the costs. The participants in private markets do not always act in a totally rational manner, and decisions are usually taken on the basis of partial and imperfect information.

"With inadequate information, individual workers or their representatives are not in a position to assess the risks associated with different occupations or jobs and demand wage premiums. Even armed with perfect information, workers may undervalue risks or choose to ignore them if the hard choice is between a job or unemployment. Consequently, differentials between occupational wage rates do not reflect in any systematic way a risk premium which varies with the occupational health and safety problems associated with different occupations.

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[5] Yet another commentator asks whether this is an argument for compensation rather than prevention.

3.
Rationale for Government's Role in Occupational Health and Safety
continued

"Similarly, employers will not have full and accurate information on hazards and the related risks of injuries, the costs of prevention and the benefits which will accrue from activities to reduce hazards. Even if such information were readily available, many employers would not decide to allocate funds to hazard reduction to the point where the benefits from activities to reduce hazards are equal to the costs. Rather, the decision may be to maximize other objects such as short-term profits or to expand product market share by keeping product prices low, a decision which would dictate minimum expenditures to reduce occupational health and safety hazards in order to maintain costs of production as low as possible.

"In the real world there are imperfections in a free market system which lead to two conclusions:

1) that resources will not be allocated to hazard reduction activities to the optimum level where benefits equal costs, and where there will be a net benefit to society from government intervention in the market place to ensure that more resources are allocated to activities to reduce occupational health and safety hazards; and

2) that the unfettered operation of private markets will produce a number of inequities, whereby injured workers (or their families) will not receive fair compensation with the result that the costs of supporting injured workers and rehabilitation costs will be shifted from employers to other members of society.

"Given these less-than-optimum results produced by the market place, there are two options open to society:

1) to continue to rely on private markets supplemented by reliance on access to the courts for injured workers to seek redress for damages; or

2) to place some emphasis on private markets supplemented by direct government intervention to bring about a more optimum supply of hazard reduction activities, and a more equitable system for compensating injured workers (or their families), assisting in their rehabilitation, and ensuring a more equitable distribution of compensation and rehabilitation costs.

"Of these two options, governments in Canada have emphasized the second one and, over the years, they have passed legislation and introduced programs, as follows:

- publicly administered workers' compensation schemes funded through levys on employer payrolls;

- legal minimum standards to be met by employers;

3. Rationale for Government's Role in Occupational Health and Safety *continued*

- inspections of work environments to determine compliance by employers with legal minimum standards;
- enforcement of minimum standards through issuing orders for compliance and/or prosecution through the courts;
- joint labour-management committees;
- education programs;
- information; and
- research."

In response to the economist's perspective, another commentator asked: how does one measure the costs and benefits of OHS? Is the "rational" (or appropriate) approach of workers to OHS to demand wage premiums to compensate for risks? Is the "rational" (or appropriate) approach of employers to allocate resources to OHS only if the costs of prevention do not exceed benefits? So, benefits from whose point of view? What is the real role or purpose of insurance in OHS? Is government intervention really aimed at achieving the optimum balance, as defined by economists, between costs and benefits? Does the Centre want to be seen as concurring with the economist's perspective?

4. Occupational Health and Safety in Canada: Strategies and the Strategic Nature of Information

Each of the approaches identified at th of the economist's comment can usefully be termed a strateg

4.1 The Question of Jurisdiction

(a) In almost every field of Canadian public policy, division of responsibility among levels of governments is a fact of political life. Table 2, taken from *A Mosaic of Mosaics*, shows that in the area of occupational health and safety there are jurisdictions within jurisdictions, and that there is also fragmentation of responsibility.

(b) The Centre's experience follows the general pattern of Canadian public policy: there is duplication of responsibility and of activities among jurisdictions, yet governments strongly resist perceived intrusions into their jurisdiction. This is a particular problem for a national institute such as the Centre, since its activities risk being seen as such an instusion unless there is a consensus among the two levels of governments involved with respect to its direction.

The Question of Jurisdiction *continued*

In OHS, about ten per cent of Canadian employment falls within federal jurisdiction. Something like 55 per cent of workers who will be covered by Part IV of the Canadian Labour Code, once fully implemented, are employed directly or indirectly by the federal government.

Outside the federal government's financial domain, the federal jurisdiction is tiny compared to those of the larger provinces. Any attempt by the federal government to extend this dominion into matters considered outside its responsibility is viewed as infringement of sovereignty by other jurisdictions.

Particularly with respect to a complex issue like OHS, overlaps of responsibility involving both different levels of government and departments within a particular level of government are all but inevitable. A recent instance of such an overlap, brought about by increasing involvement of public health institutions and professionals in occupational health, involves provincial and municipal jurisdictions and is exemplified by Ontario's new public health act[6].

Ontario's Health Protection and Promotion Act (1983) establishes the obligation to inspect, and at least in the legislation, inspection is not limited to non-occupational environments. Section 11 is the key section. It states that, where a complaint is made to a Board of Health or Medical Officer of Health (MOH) that a health hazard related to occupational health exists, the MOH must notify the Ministry with primary responsibility in the matter and, *in consultation with the Ministry, the MOH must investigate the complaint to determine whether the health hazard exists.* Then the MOH must report the results of the investigation to the complainant.

Section 12 establishes an obligation on medical officers of health to keep informed on matters related to occupational health; the Ministries of Environment, Health, and Labour and municipalities must provide the MOH with any information the officer requests if those Ministries or the Municipality have it in their possession. Section 13 further creates a broad power exercised by the MOH and the public health inspectors to issue orders for the correction of unhealthy conditions.

Divisions of responsibility or jurisdiction are not confined to relations between governments; they occur within managements, unions, joint health and safety committees, professionals, and academic disciplines.

Atherley[7] reviewed perceptions of responsibilities for occupational health and safety among employers and trade unions, and concluded that each party in its own way feels as strongly about its own

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[6] Right-to-know legislation relative to industrial chemicals is another example.

[7] Atherley, G.R.C. Strategies in health and safety at work. Production Engineering. Vol. 54 (1975). p 45-55

The Question of Jurisdiction *continued*

sovereignty as do, in their own way, governments. Employers defend their sovereignty over the right to manage; unions, over the right to collectively bargain. The very word *responsibility* is fundamentally ambiguous because it contains the idea of *accountability* and therefore of *blame* as well as *authority*. The ambiguity means that terms like 'internal responsibility system' are open to variable interpretation, and that statements such as 'management and workers share responsibility for occupational health and safety' conceal serious differences of policy. Management interprets them to mean that management's managerial prerogative remains unchallenged; labour unions, that labour has a right to participation in decision-making. Both will emphasize reciprocity of blame through labels such as 'management inaction' and 'worker carelessness'.

4.2 The Nature Of Strategies

Strategies are adopted in response to problems. Whatever their nature, problems are disclosed by vigilance and surveillance, understood by digging at the roots, and solved by applying knowledge, which includes experience, information, and data. Disclosure and understanding, both of which are essentials for successful strategy in OHS, are based on information.

At the level of public policy, the question is what specifically to legislate or regulate, what issues to address using other policy instruments, and what to leave to voluntary action. There is growing disagreement about the proper nature and form of regulations. Bryce[8] has argued in favour of performance-based standards, which describe what the health and safety objective is, but do not dictate how the objective should be achieved; that, where health and safety hazards are not unique to one particular industrial process or worksite, performance regulations become generic regulations; that generic performance provisions attempt to address the broader subject without relying upon stating an obvious or specific solution, or without focusing on a series of detailed examples of the overall problem; that present laws tend to be unnecessarily specific, complicated, overlapping and difficult for the layperson to understand.

Over the years, many strategies and policies have been tried; few if any have been evaluated for their effect, direct and indirect. In the 1970s, legislation emphasized the right to refuse, the right to know, the right to form joint committees, new ideas of inspection, and legislated permissible limits. In the 1980s, regulations arising out of the various principal Acts seemed increasingly to favour compulsory biomedical and environmental surveillance; public policy seemed to favour programs, information and education, professional development, and research. (See Appendix 3 for an example of how governments articulate such policies.) Some strategies and policies are proactive; others, reactive. Each has limits in applicability and limitations in effectiveness. The pattern is now so complicated that

[8] Bryce, George K. Rationalizing regulation. Policy Options. (May 1984). p. 41-44

The Nature of Strategies *continued*

conflicts are emerging with other strategies in social policy. Human rights overlap and conflict with occupational health and safety legislation in a manner which is yet to be fully explored, understood, and resolved. For example, occupational biomedical surveillance and comprehensive systems for occupational disability compensation, as a by-product, label people as disabled and encourage discrimination against them.[9]

Information and advice are indispensable for most, if not all strategies. Apart from information and advice, the activities which are required to develop strategies and implement them are: (a) making and enforcing the law through inspections, standards, notification, and compensation; (b) discovering the problems and their solutions through research, environmental monitoring surveillance, biomedical surveillance, other data gathering, risk assessment; (c) creating the cadre through education, and professional development; and (d) promoting action through worker-management participation and professional/scientific/ medical activity and incentives.

4.2.1 Making and Enforcing the Law.

In making the law, governments and their agencies take account of such factors as public sentiment towards government intervention and government expenditure; what employers and organized labour want in the law; scientific knowledge; costs and benefits, in both broad and narrow senses; the need to avoid conflicts with other laws or policy directions; means to delegate authority and administrative discretion. Information runs through all of this. Legislators would be greatly handicapped if they were required to legislate, and regulators to regulate, without trustworthy, comprehensive, and intelligible information.

In assessing scientific knowledge, legislators and regulators must contend with the fact that legal proof differs in nature from scientific proof. Prevention, in turn, may require the development and application of yet another set of criteria to trigger action. These differences in criteria are reflected in varying information needs and, at times, in conflicts over priorities, as in the case of non-ionizing radiations from VDTs.

In predicting or reviewing the impact of legislation, legislators, regulators and commentators may have to ask whether the law in Canada has gone too far or not far enough; whether its form and content are good or bad for the science or practice of occupational health

[9] For further discussion see (1) Atherley, G.R.C. Human rights versus occupational medicine. International Journal of Health Sciences. Vol. 13, No. 2 (1983); (2) Atherley, G.R.C.; Johnston, N. Audiometry -- the ultimate test of success? Annals of Occupational Hygiene. Vol. 27, No. 4 (1983); (3) Atherley, G.R.C.; Johnston, N; Tennassee, M. Biomedical surveillance : rights conflict with rights (NIOSH conference proceedings, not yet published); (4) Atherley, G.R.C. Biomedical surveillance: editorial. American Journal of Industrial Medicine. Vol. 7 (1985). p. 269-271.

Making and Enforcing the Law *continued*

and safety; whether inspections are done sufficiently or too much; whether penalties are too large or too small; and how specific or general regulatory activity should be.

Law embodies norms and standards set in an environment where cost-benefit analysis is inescapably controversial, and where tough standards are not seen as intrinsically meritorious, or enforceable, or economically beneficial. Standards (in the broadest sense of the term) are, however, only as effective as their implementation or enforcement. That process relies heavily on the exercise of administrative discretion--a process which is, in turn, dominated by fear of costs.

Fear of costs often leads to an indefensible presumption in favour of the existing situation. Scientific uncertainty makes "proof" of harm or hazard difficult, likewise inhibiting action and favouring the *status quo*. Scientific research, though it advances knowledge, also advances scientific uncertainty.

At the most fundamental level, workers' compensation represents a response to failures in prevention. Canadian workers' compensation schemes have direct links with prevention through accident prevention associations, research, statistics, and publicity. They have indirect links with prevention through funding mechanisms, requirements for Boards to balance accounts, experience rating, sanctions (arising out of claims experience, observed conditions, and penalty levies), special funds (such as silicosis) through expansions of the lists of different diseases recognized for workers' compensation. Compensation for occupational injuries is effective and, therefore, costly. Compensation for occupational diseases is ineffective and, therefore, cheap.

Factors contributing to this ineffectiveness include the inconclusiveness of contamination levels and permissible limits as evidence of causation; multiple causes of diseases; and apparent variations in individual susceptibility. Not only do these factors constrain the development of preventive approaches, but they also make compensation-based statistics unreliable as measures of occupational health. The experience of preparing this report clearly revealed that the data they do produce do not serve many strategic needs in occupational health and safety. Information is crucial to legislation, yet legislation's strategic information needs are not adequately met.

4.2.2.
Discovering Problems and Solutions.

Research is the essential category of activity in discovering OHS problems and in seeking solutions. Appendix 4 presents an overview of current OHS research in Canada. At the same time, the research enterprise suffers from a number of problems. Directions in research are subject to long-term trends: for example, permissible exposure limits have been the mainstay of industrial hygiene in North America

Discovering Problems and Solutions *continued*

for roughly half a century, during which time major shifts have occurred in ideas about their purposes. Research strategies have altered accordingly. Attention to research methods sometimes obscures the object of the research. And research may sometimes function as a substitute for preventive actions which are thoroughly justifiable on the basis of information about *potential* risks or hazards which is already available.

Organized labour looks to research as a stimulus and support for new recognitions in WCB acceptances, new protections in regulations, and new approaches in collective agreements, and new criticisms of old standards. Governments look to research for preparation of policy or for justification of programs; in the conduct of research they want coordination, facilitation, and cooperation as ways of getting value for money. What employers look for is unclear. Within the administration and funding of scientific activity, OHS is always in the two-man's land between medical and scientific research, between government and institutional support.

In OHS, research should be a way of getting information which can be applied; OHS is a field of action, not a scientific discipline, and not an homogenous subject. Unlike toxicology and biotechnology, recent candidates for quasi-national research institutes, OHS possesses no distinctive research methods, techniques, and equipment for concentration under a single roof. In occupational safety, the closest thing to such a collection of techniques and methods is applied psychology, which has been rightly criticised for its preoccupation with unsafe acts and its neglect of unsafe conditions.[10] In occupational health, the closest approximation is epidemiology, a set of techniques of statistical research applied to the data of disease and death. It appears appropriate for a small and declining proportion of research needs in OHS[11]; not least because it has led OHS research to a preoccupation with the condition of workers' persons rather than the conditions of the persons' work. In some recent approaches to OHS, attention is given to the totality of the working environment, a move in step with other fields of biological concerns, such as acid rain.

Research in OHS produces huge amounts of data which are widely scattered, and arranged according to no consistent plan. A familiar distinction is that between basic or pure and applied research. Given the explosion of scientific activity in fields comprising both basic and applied research, a more important distinction from the point of view

[10] Ryan, W. Blaming the victim. New York : Vintage, 1972

[11] Dr Robert Whiting, a toxicologist on the Centre's staff, commented that occupational epidemiology has identified no new occupational carcinogen since vinyl chloride, a decade ago. He asked whether this means that none are left to discover, or whether epidemiology's techniques are inadequate.

Discovering Problems and Solutions *continued*

of OHS is that between primary and secondary research, the latter being defined as work which aims to advance knowledge through ordering and understanding the results of primary research.[12] Secondary research is no less rigorous than primary research: both are characterized by "intentness on facts and their relations." And secondary research, particularly in the OHS field, is anything but secondary in its importance. The scattering of effort, the shortcomings of method, the suspicions of bias, and the need to learn from experience make secondary research crucial in the fulfilling of workers and governments' needs; it might also be valuable for employers.

If there are so many problems with primary research, how can secondary research be any improvement? Secondary research sorts the wheat from the chaff; it provides new knowledge or new applications of old knowledge; its techniques are needed to examine the field of knowledge; its unique expertise is to evaluate, to explore, to identify gaps, and to propose ways to reliably extend knowledge. Unlike theoretical physics and other strong scientific disciplines, OHS research does not stop at explanations, but has to go on to applications; applications rely on valid and relevant explanations.

Because OHS research must be applied (or at least amenable to application), it must be responsive to need. At the same time, the world in which OHS research functions is one of pressures, concerns, decisions, economics, interest groups, and preoccupations, making it vulnerable to defects supposedly not seen with basic research. For example, preoccupation with the runaway costs of workers' compensation stimulates research in ways to reduce them, research which occasionally acquires an unsavory reputation.[13] If responsiveness to need causes research to be too responsive, the result will thus be a rapid (and deserved) loss of credibility.

4.2.3
Creating the Cadre.

Canada's numerical needs for strategists, research scientists, educators, and practical professionals are unknown and unestablished. Educational programs are promoted with government support, and professional groups put pressure on governments to augment

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[12] See Appendix 5 for a more detailed discussion of the history and importance of the secondary research concept.

[13] As in the comments made to me, in early 1984, by a manager in Ontario, about new scientific methods for detecting untruth-tellers' non-backaches, and research into surveillance methods for excluding 'compensation risk' workers. The *New Scientist* of 1984 03 08 under the heading 'Early warning for industrial deafness' reported the patented research of Dr David Kemp, of the University of London, which provides a method to check employees' hearing at pre-employment and regularly during employment. The beauty of the system, said the *New Scientist*, is that it provides an early warning of deafness and cannot be fooled, as current audiometric tests can, by workers who only pretend they are deaf.

Creating the Cadre *continued*

university professional programs[14], and to create demand for professional services through legislation. The Centre's experience, which admittedly may not be representative, suggests that the major priority in OHS today should be better utilization of existing human resources. For example, in March 1984, the Centre advertised a vacancy for a project scientist, requiring a PhD and several years' experience, and one for a project officer, requiring a degree in some relevant subject and some experience. Of 57 applicants for the project scientist position, 26% were without employment; of 138 applicants for the project officer position, 46% were without employment.

As suggested in Appendix 6, the future direction of occupational health itself, a crucial element in prediction of personnel requirements, seems disputed. This uncertainty suggests that the needs for the cadre should be objectively reexamined by a body independent of health professionals.

Government inspectors (and related personnel) are not a recognized profession, and there is no specific academic training or distinctive professional qualifications. If inspection is so important to law enforcement, it could be asked why more is not done for the professionalization and academic training of government inspectors, and whether the academic and professional basis for government inspection in Canada should be examined.[15]

Management, on behalf of the employer, is ultimately responsible for OHS. The question therefore arises of how far senior management really is involved in making decisions and accessing options, and to what extent it can properly leave its OHS responsibilities to OHS professionals. The cadre should be expert in OHS, which means that professionals should be important sources of information. Doubts about the role, training, allegiance, and function of professionals undermine the credibility of the information they provide both for managements and for workers.

4.2.4
Promoting Action.

Action on OHS may be promoted by experience rating (arising out of compensation claims), or by economic mechanisms, incentives, as well as by regulations and participation typefied by "internal responsibility". But there are limits to what participation (internal responsibility, or what any instrument) can achieve: the Centre assumes that preventive action follows trustworthy, comprehensive, intelligible, and relevant information, but we lack the proof that it does. And only some problems are best handled through professional/scientific/medical activity.

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[14] As in recommendations 3, 4, and 7 of The Metropolitan District Health Council Report: Workplace health and safety in Metropolitan Toronto. (Metropolitan Toronto District Health Council publication). Toronto : MTDHC, 1984

[15] See Kagan, R.A. On regulatory inspectorates and police. In: Hawkins, K.; Thomas, J.M. Enforcing regulation. Boston/the Hague : Kluwer-Nijhoff, 1984. p. 37-63

4.3 The Strategic Nature of Information and Advice

The following section is a labour perspective provided by a commentator and quoted in full.

"While it appears on the surface that everyone continues to agree that the Centre must provide information and advice, it has never been clearly defined exactly what each of the participants in the tripartite arrangement see as 'information' and 'advice'. During discussions on various developments in occupational health and safety in various jurisdictions, it has become clear that there is a profound conflict among labour, government, and industry on what information must be made available and to whom.

"Industry opposes full disclosure of ingredient information by chemical name and weight. While their objections are couched as concern for trade secrets, trade secrets may be a minor matter, overshadowed by the strategic nature of information which is at the base of their concern. Industry does not want workers to have access to independent toxicological assessment of the materials that are present in the workplace. In a particular situation, industry refused to accept full disclosure of ingredient information even where legitimate trade secrets would have been protected. The crux of the opposition lay in the immediate connection between the chemical name and the specific toxicological information.

"Industry's concern about disclosure stems from ideological distaste of having government interfere with business and, more important, from commercial concern about consumer (worker, employer and even household) resistance to purchasing materials that are known or can be found to be hazardous, and from growing fear of product liability. Information is strategic; controlling information is a basic tool in maintaining power, whether in the workplace or in society generally.

"But chemical names of ingredients are not the only information denied to labour. In Ontario, during the designation of benzene, industry provided the government with cost, feasibility and even exposure data that were to be treated confidentially. The government was not able to verify the cost estimations in other than crude comparisons between companies, and with US data. Labour was denied any access to the information that might have allowed them to question or challenge the claims. Based on that confidential information, the standard for benzene was raised from 1 ppm to 5 ppm, and the government rejected its own risk assessment on which it had based its original proposal, and which it had vigorously defended throughout industry's attack on the method.

"Industry's concern was not so much to protect secret manufacturing process information which, after all, our members have some fairly comprehensive insights of, but more to control the process of standard setting.

Information and Advice *continued*

"That such effort at control is not a new problem was revealed during the Royal Commission on Asbestos, when Bailus Walker Jr., the former Director of Occupational Health Standards for OSHA testified under oath, that:

> 'It is important to point out here that what the Court did not know was that during the development of the benzene standard that workers of a large US chemical company exposed to less than 10 ppm had been found by the company's own scientists to have significant increase in chromosome damage. This information was withheld by the company until after the Occupational Health and Safety Administration had published the filed benzene standard and it was too late to include the information in the administrative record for court review.
>
> 'So given the critical evidence was withheld from the agency it is difficult to blame the agency for not doing a better job of quantifying the risk under ten parts per million of benzene.
>
> 'I think that the benzene example shows the conflicting and often political role that industry plays in occupational regulations. Some segments of the industry have failed to gather, or have withheld or distorted or manipulated, evidence which would have strengthened the case for lower occupational exposure levels to hazardous substances, and yet when the standard is finalized the industry used in its suit to block its implementation argument that there is inadequate evidence of significant risk.'
>
> Transcript Volume 36, pp. 4-5

"In occupational health, almost more than any other area, information is fundamentally political. Even its content expresses values. What does all this mean for the Centre? Everyone is agreed that it should be providing information and advice as long as that information and advice does little or nothing to challenge the basic power relationships. If the Centre were to provide labour with a savagely critical analysis of cost estimations or feasibility statements made by industry, I believe that it is fair to say that industry's support for the Centre would soon wane even if the analysis was correct and professionally competent[16]. In this way, I believe that the tripartite nature of the Centre, while necessary for securing its funding and for gaining credibility among all parties, can work to limit the functions that the Centre can fulfill and the information and advice that can be provided.

[16] The Centre's experience shows that the same comment applies to the other parties. The Centre's recent report on worksite OHS committees produced strongly negative reactions from labour commentators. The Centre's publications on VDTs produced strongly negative reactions from federal and provincial government officials. The negative reactions arose as much from perceived erosions of feelings of sovereignty as they did from concerns of a scientific nature. Challenges to sovereignty disturb power relations.

Information and Advice *continued*

"I believe that the distrust that workers have for scientists and professionals is also based in traditional power relationships as well as the scientific method itself.

"The scientific method is basically very conservative. The requirement for scientific proof means that further research is always necessary before action is possible. All of this means that, at best, labour sees scientists as sitting on the fence; at worst, acting against their interests.

"But again it is the strategic control of information that is at the basis of distrust. All professions like to cloak their knowledge in jargon and special forms of analysis in order to maintain their professional status; as one trained in sociology I know that all too well. So, too, do the professionals in health and safety who cloak themselves in the 'professional judgement' they say is needed to assess the hazards and to recommend solutions. Any sharing of the assessment or solution finding is seen as a threat not only to their professional judgement, but also to their security to employment. Workers are constantly faced with arrogant professionals refusing to explain what they mean and stating that the information is really too complicated for them to grasp.

"But more alarming still are situations where basic conservatism and the professional elitism combine to work for industry. More and more professionals are speaking on behalf of industry: all of this representation is, essentially, to control the information flow in order to protect the traditional professional power structure.

"The professionals are seen by labour as pushing the debate over health and safety into the realm of scientific proof, quantitative risk assessment and then cost-benefit analysis, things which serve science, and academia and industry but which essentially exclude workers from participating. Alleged need for scientific proof is used by scientists and industry to delay action[17]. It is interesting that, in other areas of public policy, scientific proof, still less absolute proof, is not always necessary for even dramatic government action: economic planning cannot be said to be based on scientific proof. In occupational health and safety, all too often the professionals have somehow managed to persuade many governments to postpone action or to set up further research, in the interests of scientific proof.

"The other problem that some of us have in this field is the assumption that occupational health research is value-free science. Some would say that little if any science is value-free; that the fields of occupational epidemiology, risk assessment, and cost-benefit analysis are fraught with problems or reliability of data, manipulations of cohorts to minimize effects, and mathematical modelling

[17] Another commentator challenged the generality of this statement on the grounds that industry delays action in order to use its resources effectively; that industry avoids surprises and excessive costs; that business people delay action when its result is unclear or its benefits are questionable; and that, in the case of vinyl chloride, industry was ahead of government and labour in initiating action.

Information and Advice *continued*

reflective of conflicting values in our society. Labour is not denying the need for research but it is insisting that people must be informed of the potential hazards in interpreting this science. I am shocked, for example, by the Royal Commission's relying on one study of one friction products plant, which they admitted had no exposure data before 1967 (a crucial period), which had a minimum follow-up of only ten years, and which had a cohort containing many short-term employees. Despite these shortcomings, the Commission relied on the study for a risk assessment (based on ten years of exposure at half the limit, and on twenty-five years at the limit as the worst case) and stated, with what appears to be complete assurance, that the death rate in both cases would be less than the accidental death rate in mining, construction, etc., and that, therefore, it is somehow acceptable. But, of even more concern, they then carried out an analysis of what it would cost to save an asbestos worker's life (based on industry's estimates) and concluded that in that particular industry this would be simply too expensive.

"From all of this, it may appear as if I do not believe that occupational health regulations should be based on good science. That is not the case; I merely believe that it is a question of what is 'good science', of what we are trying to do in regulatory action (protect workers, protect industry, promote science, employ physicians, or merely to make semblance of doing something when nothing is changed), of what the intention is of government so far as enforcing regulations is concerned. In Ontario, for example, we have a situation where the government produces a standard that is supposed to apply equitably across the province. But the government provides a mechanism in the 'internal responsibility system' by which employers can essentially bargain away this equity and if the workers (often under economic blackmail) agree, the Ministry does not intervene.

"Regulatory activity in occupational health and safety regulation may have a science base but it must never be forgotten that it also has a labour relations base, and a potential redistributive effect in our society. Regulatory activity in occupational health is not 'motherhood'; it can be a tough mechanism for altering all manner of traditional power relationships in our society. I get the feeling that some of the professionals do not understand that, but I believe that industry, government and labour understand that very well."

5. The Role of The Centre

5.1 Expectations for the Centre in 1978

In October 1978, the Planning Secretariat of the Centre sponsored a one-day seminar, *Occupational health and safety in Canada: problems and solutions*. The speakers were authoritative; the participants, representative. The synopses which follow derive from analysis of the transcript. Though the inclusion of other contemporary sources would broaden the scope of the analysis, it would not materially alter the picture presented.

Expectations for the Centre *continued*

In the seminar, there was consensus that the Centre should be a national institute and that its foremost function should be to organize and disseminate information and advice which would be down to earth, go beyond what a library could provide, come from international and inter-agency exchanges, and be credible. There was no consensus on what information actually is, and what else the national institute should be or do.

Opinions expressed held, variously, that the Centre might:

- be tripartite, and serve governments, employers and their associations, and workers and their associations;
- be multipartite and serve governments, employers and their associations, workers and their associations, and professionals and their associations;
- act as a vehicle for, or promote cooperation;
- act as a source of expertise, consultants, technical assistance, and personnel for loan to smaller provinces;
- act as a focal point for discussion between the parties; equalize standards, set standards;
- confront government with expert opinion;
- do research into specific problems; not do mere data gathering;
- not do research at all;
- fund research, educational developments, and professional developments;
- produce training materials;
- promote health;
- reinforce labour's rights to access to information and to acquire knowledge;
- unify the professions in OHS; and
- absorb the OHS function of the Canadian Association of Administrators of Labour Legislation.

5.2 Concerns For and About the Centre

A further set of concerns was that the Centre might infringe jurisdictions, or that it might acquire an enforcement role. Opinions were expressed that the Council might get too large, become dominated by academics, or that the Centre might absorb too much Canadian

Concerns *continued*

expertise. Some participants feared that the Centre's funding would not be adequate, while others were concerned about the effects of excessive funding. Other concerns were that the Centre might be doomed by preconceived ideas before it began; be a smokescreen for federal inactivity; be divisive and display political bias; not be a source of worker power; be too strong a source of worker power; not get appropriate cooperation from universities and colleges; continue to lack a specific direction.

5.3 The Picture of the Field of Occupational Health and Safety in which the Centre was to Operate

In the seminar, there was no obvious consensus except, possibly, that OHS was an unsolved problem likely to continue to require attention. Opinions expressed held, variously, that:

- labour was clearer than employers on how it saw OHS, as well as on what it wanted from the Centre;
- employers and managements' perspectives were not clearly stated and their representation was often poor, yet they were looking for what to do because tardy acknowledgement was a threat to corporate survival;
- employers accepted workers' right to refuse, but saw a need for education and training in support of it;
- employers and labour favoured joint worksite OHS committees;
- an ineffective approach to OHS could erode management-labour relations;
- Canada is overgoverned, and there are limits to what legislation can achieve;
- tough laws are needed, not just to appease labour;
- costs of OHS, not just compensation, are a fear;
- internationally, Canada had a poor showing in OHS, and was dependent on the USA for scientific knowledge;
- OHS was an academically unsatisfactory subject, diffuse, poorly coordinated, producing scientific work which was not always trusted;
- the scope of OHS was unbounded, extending to include public health;
- the need for and the existing size of the Canadian cadre of professionals and scientists was unknown;

The Picture
continued

- there was a shortage of professional and scientific personnel;
- there was insufficient focus on unsafe acts;
- there must be protection for priority information like trade secrets;
- and that industry possesses much knowledge of which government ought to take more account.

5.4 The Centre's Functions as seen in 1978

The seminar produced a strong consensus and clear statements on information and advice as the primary function for the Centre, but it produced no consensus and little clarity on other things which the Centre should do. Strong expectations were expressed that the Centre would fund research, but no reference was made to the absence of such a specific mandate in the Statute. And a rosy picture was painted of the funding prospects for the Centre itself, despite the absence of any firm budgetary commitments at that time on the part of the government.

There was a clear separation of opinion on the issue of multipartitism *vs* tripartitism in the Centre's governance, but the issue was not directly addressed. The absence of consensus at this point is notable because the seminar took place six months after the enactment of the Statute, which laid down a tripartite rather than a multipartite structure for Council--a change introduced during debate on the Bill, and not applauded by some of the professional groups. Indeed, the Centre itself was not always consistent in its approach to the issue.[18]

The Centre stoutly denied any intentions to infringe on jurisdictions. Harder to rebut was the vague disquiet that the Centre was to be yet another arm of technical bureaucracy isolated from the workplace, costing a lot of money, and doing nothing effective. The legal duty of the Centre was to receive briefs, but what briefs were and how they would be dealt with was and remained unanswered because up to April 1984 the Centre had yet to receive anything which it defined as a brief.

Employers and line management were in the background, being spoken for and about, rather than speaking themselves. Line management's perspective appeared not to differ from labour's as much as might have been expected: the greatest potential difference existed between labour and professional perspectives. Labour wanted knowledge in order to exercise its rights to solve its problems; the professionals wanted reliance placed on professional expertise.

[18] For example, *At The Centre*, the Newsletter of the Planning Secretariat (later adopted as the house journal of the Centre) carried an editorial by J H Currie (Volume I, No 5, 1979), on the occasion of the inauguration of the Centre, who described it as a truly cooperative, national and *multipartite* institution. Later in the same issue there is reference to the *tripartite* nature of the Council and the Executive Board.

5.5 The Centre in 1984

In April 1984, the Centre consisted of about 90 people who, in three roughly equal groups, provided scientific, professional, and support services for the information and advisory work; maintained the computer system and built the data bases; and administered and supported all the work of the Centre. It consisted of a building of 44,000 square feet; of a computer, the source and centre of a growing on-line occupational health and safety information system; of a scientific-technical information resource; of four home-built data bases; of two major data bases, one from Europe and one from the USA; of access to hundreds of other data bases in the USA and elsewhere; of international exchange points for OHS information; and of a small publishing house. The Centre's development plan calls for staff to be increased to about 140, and development and consolidation of the Information and Advisory Service, by means of computer and other electronic communications.

The Centre's house specialization is secondary research, fundamental to information and advisory work and itself strategically important to OHS.

The Centre provides trustworthy, comprehensive, intelligible information and advice according to high standards of evidence, cogency, and probability, through letters to individuals, publications of various kinds, document supply, committee membership, presentation of scientific papers, teaching, training, and scientific refereeing. It enforces no legislation, carries out no primary research, and inspects no workplaces--making it different from many other institutions in occupational health and safety in Canada and elsewhere.

The Centre assists problem-solvers, but does not tackle problems directly. It is a national institute without jurisdiction, and with a limited mandate, as yet incompletely developed. The Centre is by nature independent of government, yet dependent on the federal government for funding. It is tripartite, but with substantial professional and scientific subrepresentation. The Centre operates on consensus, promotes consensus, and explores consensus. As implied elsewhere, consensus has its limits.

The Centre's expertise goes beyond data into expert opinion and expert knowledge. The expertise the Centre should express is scientific, scholarly, applicable; not obscure, unintelligible, or irrelevant. The Centre's awareness of OHS problems comes from the daily work of inquiries. Its expertise comes strongly from inquiries work, study, scientific involvement, rigor, comprehension, discussion, lecturing, and time; it comes weakly from hosting major conferences, hiring consultants, commissioning reports, staffing by 'matrix', sitting on committees, and brief encounters. The Centre should not dissipate its capability but avail its expertise to others; it should expose itself to problems which matter to its clients, and create its own cadre in whose heads and hands its expertise lives. The Centre in using secondary research can navigate primary research through the minefields which guard approaches to such things as standard-setting.

5.6 The Centre's Future

Beginning in June 1984, the Centre's Council of Governors began a process of discussing future directions for the Centre. At the first of two meetings devoted to this exercise, Council's discussions identified potential future activities for the Centre. These suggestions were referred to the Centre's staff and Executive Board for preparation of proposals and discussion of feasibility. The Executive Board attached high priority to:

- improving access to information;
- an increasing role in research: inventory, gap identification, stimulation of research in problem areas, hazard identification and risk assessment.

Areas with potential which should be explored are:

- a role for CCOHS in developing statistical data bases focussed on occupational health and safety;
- an expanding role in technical advice.

Areas which require no further attention at this time are:

- certification of professionals;
- funding of research.

In October 1984, at the second of the meetings, Council reviewed the recommendations prepared by Executive Board following the first Council meeting. Governors saw expanding access to information and advice as the highest priority for CCOHS. They felt that joint health and safety committees should be a major resource for the dissemination of information; strongly supported the development of CCOHS' capability to acquire, disseminate, pool, analyze, compact, and enhance utilization of information; and believed that CCOHS should play a larger role in making information available to small business, industry, farmers and unorganized labour.

Some Governors thought:

- that there could be important roles for CCOHS in statistics and in training, education, and conferences, although there were questions about priorities and on the extent of involvement;
- that CCOHS, in a facilitating role, could become involved in standard setting, act as a sounding board for proposed legislation, and validate proposed standards;
- that CCOHS could coordinate background documents in hazard identification and risk assessment, but without making recommendations for standards;

The Centre's Future *continued*

- that CCOHS might play a facilitating role in establishing committees of scientists, workers, and government representatives working together in the examination of risk assessment data, and developing standards acceptable to all parties involved;
- that CCOHS could develop a role as coordinator by surveying the provincial organizations' work in the field of occupational health and safety, and selecting the best elements of the various programs;
- that there was no reason to reconsider the decision on funding research;
- that CCOHS could play an increasing role in research by evaluating the state of existing knowledge, producing an inventory of research, and promoting and participating in research;
- and that CCOHS could identify gaps in knowledge and refer its conclusions to appropriate organizations.

Furthers comments were that:

- the role of Council should be expanded to include duties other than governance of the Centre;
- that Council, representing Canada's geographical regions and diverse industries, could select issues of national importance that require a catalytic influence to initiate appropriate action;
- that Council should issue position statements on issues of national importance in occupational health and safety;
- that Council should not issue such position statements lest its work become divisive and counter-productive;
- that agencies exist and are being established with overlapping, adjacent interests and that a careful analysis must be made of work being done;
- that constructive cooperation with other agencies is vital to eliminate duplication;
- that the role of various organizations should be reviewed as a first step; and
- that an official network between CCOHS and jurisdictions should be established.

6. Conclusion

Key Issues in the 1980s for Occupational Health and Safety and the Centre

The key issues in the 1980s for occupational health and safety and the Centre as revealed by this report reflect several important gaps in knowledge which are in need of filling, as follows. In summary, we lack:

- a thorough investigation, analysis, and identification of the nature and trends of occupational health and safety problems in Canada, and their related costs;

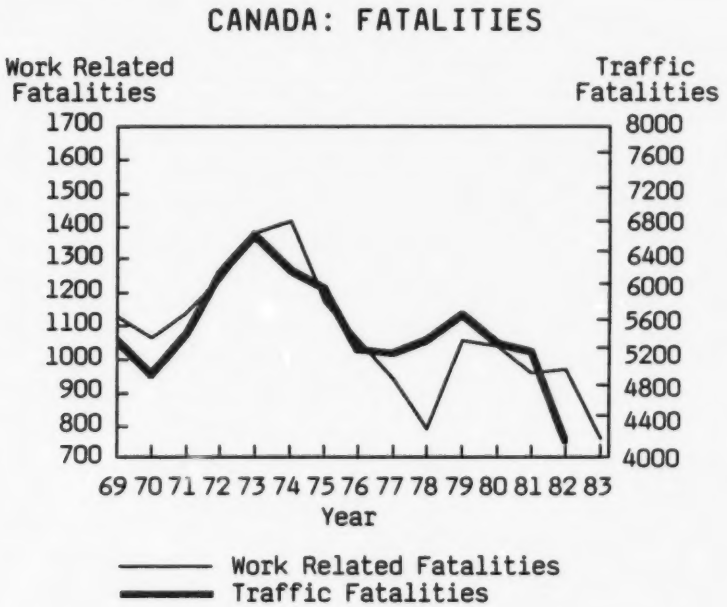
- a review of the effectiveness of existing strategies to cope with occupational health and safety problems, and there is a need for a review which would allow an assessment of the complementarities and conflicts of current strategies.

There were limits to consensus on what the emergent Centre should be and do. There are limits to consensus on OHS in Canada, on problems, costs, and solutions, on strategies, and among jurisdictions. There are always going to be limits to consensus on what the Centre should be and do.

Figure 1 Canada: Fatalities*

Work fatalities are shown with the solid curve and the left-hand ordinate; traffic fatalities, dashed curved, right-hand ordinate. Spearman's rank correlation coefficient, rho, is .77, p = .0026, confirming the eye's impression that the two sets of data correlate. Such correlations have been observed before, suggesting that the distinction between work and traffic, so far as fatalities are concerned, is more administrative than fundamental. Some work fatalities are transport accidents; some transport accidents involve people who are at work as professional drivers and the like.

The trend in the work fatalities is slightly down (y = 1276 - 25x).



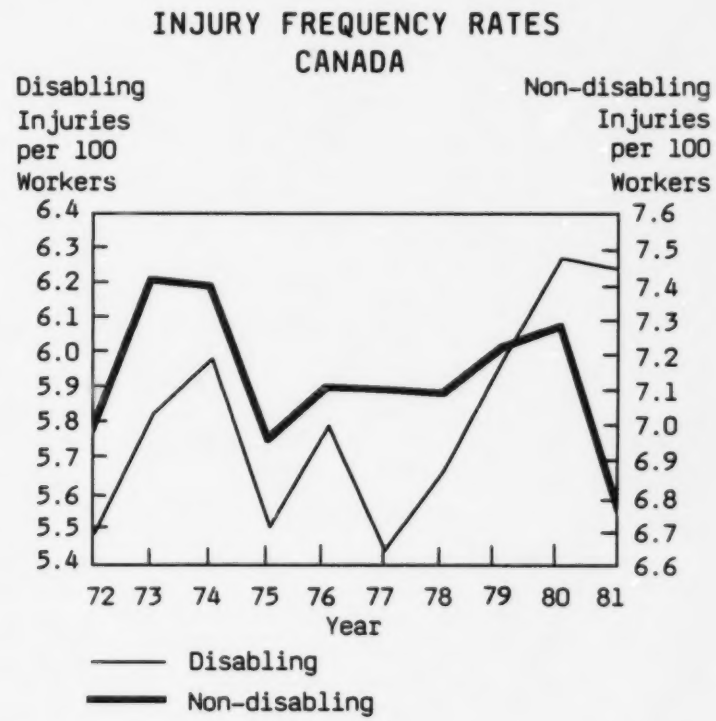
Data for Figures 1, 2, and 3 compiled from: Employment injuries and occupational illnesses, 1972-1981. Ottawa: Labour Canada, 1982

Figure 2

Canada:
Injury Frequency
Rates, per hundred
Workers

Disabling rate, per hundred workers, is shown with the solid curve and the left-hand ordinate; non-disabling, dashed curve, right-hand ordinate. The trend in the disabling rate is slightly up ($y = 5.51 + 0.06x$); non-disabling rate, slightly down ($y = 7.14 - 0.02x$).

It is obvious from the lines that great confidence cannot be placed in the trends.



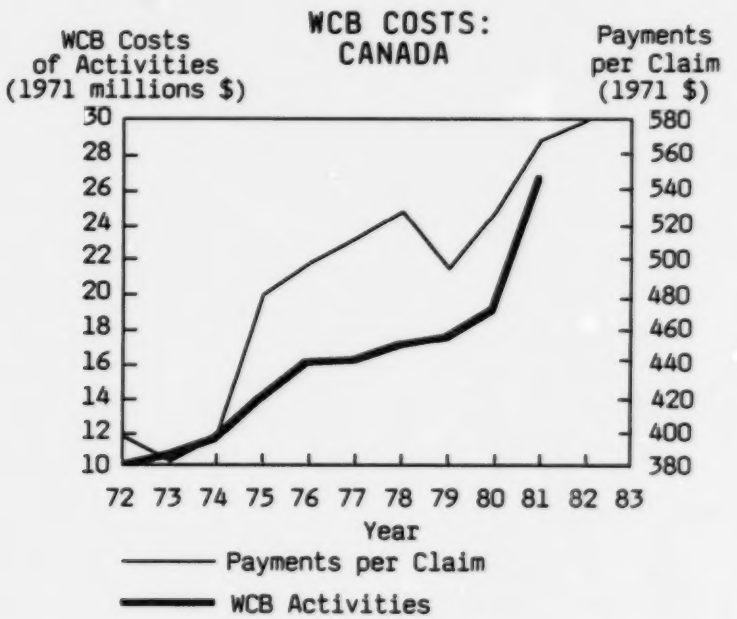
Source: Labour Canada *Employment Injuries and Occupational Illnesses*, March 1984 - Table 1.4

Figure 3

Canada:
WCB Costs,
in 1971 Dollars

The costs of prevention (see below) are shown with the solid line, left-hand ordinate in millions of dollars; dollars per claim, dashed line, right-hand ordinate.

The costs of prevention are those attributable to activities by the compensation boards in Canada, and do not include those of government departments and agencies involved in prevention and research, or other prevention costs.



Appendix 1: The Status of Systems for Collecting OHS Statistics in Canada and the Prospects for a Canadian System[1]

The Rationale

In Canada, almost no task force or commission report is issued without recommendations for enhanced data collection and analysis systems. The recommendations come from the belief that properly applied statistical information could be an important tool in designing strategies to prevent occupational accidents and disease, and recur despite the generation of enormous amounts of statistical information. The only justification for spending more time and energy on statistics is enhancing our abilities to reduce the human and economic toll caused by workplace accidents, fatal and otherwise, and occupational disease.

That Canada needs to develop effective strategies to reduce the toll on its workers can clearly be shown. That more effective preventive strategies are needed seems an inescapable conclusion. A national statistical program could provide data upon which effective prevention strategies could be based, though careful preparatory work is required.

The Present Situation

Data generated by Canada's workers' compensation system come to mind first in any discussion of occupational health and safety statistics. But potentially useful data are collected by cancer registries, medical insurance programs, the Bureau of Vital Statistics and various departments and agencies of governments. Some of these programs respond to provincial needs; others, to federal needs; few, to national needs; almost none, to needs specific to the prevention of occupational accidents or disease, though progress is being made. Some systems do not collect any information on the occupation of the individual. For provincially-based systems, the goals of nationwide consistent methods of data collection and organization have not yet been achieved.

The Canadian workers' compensation system collects data regarding claims successfully adjudicated by a board but, because not all workers in any jurisdiction are covered, the data are not comprehensive. For example, several jurisdictions are now wrestling with the thorny issue of compulsory coverage of all individuals involved in agriculture.

For many diseases, particularly those which appear many years after exposure, the data available probably represent only a fraction of the true incidence. Difficulties in diagnosis and the imperfect state of knowledge about cause-effect relation undoubtedly further contribute to underreporting. For some types of disease, it is becoming increasingly clear that employment, lifestyle, and unknown factors are all

[1] Based on a paper presented to the Meeting of Ministers responsible for occupational health and safety, 1984 09 19.

The Present Situation *continued*

important. For such diseases, it seems unlikely that any scientifically valid and reliable means will be developed in the near future to reliably classify diseases as work-related.

For accidents where the work-relatedness of the trauma is clear, the data available through the boards (for individuals covered by the board) are probably reasonably complete, even though persuasive arguments can be made to suggest that the incidence of accidents is underreported. Even for accidents, the information gathered is generally insufficient to support any analysis of cause and prevention. For example, compensation data clearly point to back injury as a major occupational problem in Canada, but they provide few clues on causes and even fewer clues on prevention.

There are problems with the completeness of the compensation data as presently collected. It is not uncommon in any statistical analysis of compensation data to discover that as many as 25 % of the claims records are incomplete with respect to occupation or nature of the injury.

Most experts in the field of occupational health and safety statistics are unwilling to attempt to present an overall picture of the Canadian situation. In response to legitimate provincial needs, different definitions, classification systems, and methods of data handling have evolved. Given these inconsistencies, it is difficult to treat the data from an overall perspective without resorting to so many assumptions that the conclusions are rendered suspect.

The most serious problem is that no statistical program exists with the specific intention of providing data for strategic use in preventing occupational accidents and disease. The experience in Canada and elsewhere is that unless the data is gathered, organized, and stored specifically to serve strategic needs, essential data elements and means of retrieval will not be automatically built into the system. The experience elsewhere is that the adequate gathering, organization, and storage of strategic data are immensely difficult to achieve.

Within the limits imposed by available resources, most boards seem to be willing to modify and improve data collection and handling procedures to make the data more useful for prevention. But considerable care is required to ensure that the greatest possible value is extracted from existing data systems before new ones are implemented, or expensive changes made.

A Nationwide System for Canada

Fully developed, a Canadian occupational health and safety data system would consist of a complex interrelated network of data collection and manipulation programs. It would provide access to the

A Nationwide System for Canada *continued*

kinds of data now gathered by the compensation boards, cancer registries, birth defect registries, agencies or governments, and others. The components of the system would be designed to yield information useful for prevention by making available necessary data on the individual's work history, details of the incident, information on the employer and a host of other factors. The system would be accessible to labour, employers, researchers, and regulators to meet real workplace needs.

A beginning has already been made. In the early 1960's, following the recommendation of the Canadian Association of Administrators of Labour Legislation (CAALL), Labour Canada began contacting the provincial Workers' Compensation Boards with the view of establishing a data base of national work injury statistics. In the 1970's, the National Work Injury Statistics Program was transferred to Statistics Canada. By August 1984, seven provinces had submitted data and data for the three remaining provinces are expected in the near future. Individual boards contribute selected data to Statistics Canada where some data restructuring is undertaken. Although the program may not yet have met expectations, the first steps have been taken.

A Canadian system could build on this beginning by developing into a national strategic unit. The unit would develop consensus on what data should be collected and how it should be organized. Initially the unit might focus on a particular problem, but it would be clear from the outset that the goal would be to integrate compensation data and the other data collection programs.

Progress towards an integrated national system will undoubtedly be slow as the system will require fundamental changes to a number of programs. It is not unrealistic to expect that twenty years will be required before the system could fully realize its potential. For this reason, preliminary studies are essential.

Were a strategic unit to be contemplated, an initial review of the Canadian situation in health and safety data collection should be undertaken. The review should identify existing data collection activities, relevance of data to prevention of occupational accidents and diseases, gaps in data collection and obstacles to data accessibility. Armed with such a review, a strategic unit could be developed to take advantage of areas where early advances could be made.

Because the world will not stand still over the next two decades, and because the working public may become impatient with preliminary studies, the strategic unit will need a service arm which responds, as well as is possible in the short term, to the statistical needs of the workplace, and which will seek to make the best possible use of existing data.

A Nationwide System for Canada *continued*

The problems to be overcome are many. No such system exists anywhere in the world and many experts doubt that the kind of data systems which are needed are achievable under any conditions. Changes will be required in systems which began operation over a century ago. Uniform procedures and practices will have to be adopted, in some cases, by thirteen jurisdictions. Data collection costs will rise and those organizations bearing the costs will not, in many cases, be the beneficiaries of the system. Confidentiality of personal and corporate information is an issue which will have to be addressed.

Yet the demand and the need exist for the type of data which an integrated Canadian system could produce. The framework of a data collection and organization exists although it is highly fragmented. The effective coordination and organization of this decentralized activity will require the establishment of the national strategic unit strongly supported by all the jurisdictions.

Appendix 2

Public Letter from Dr. J. Donald Millar,

Dr. J. Donald Millar, MD, DTPH (Lond.), Assistant Surgeon General, Director, National Institute for Occupational Safety and Health, Centers for Disease Control, Atlanta, Georgia.

Early in 1983, the US National Institute of Occupational Safety and Health published a report on the ten leading work-related diseases, a report which rapidly became controversial. The following letter appeared in the May 1984 issue of the Journal of Occupational Medicine[1].

> "Some weeks after becoming Director of NIOSH in July 1981, I selected four directions for the first years of my tenure as Director. One of those was 'to define the most important occupational diseases and injuries, and direct the Institutes' resources toward prevention of these problems." In order to start some action in that direction, we needed a ranked listing of the major work related diseases and injuries. We looked for such a listing, but found none.
>
> "Early in 1982, I called together the scientific leadership of NIOSH (Directors of the Divisions and Offices), split them into two subgroups, and asked them to develop (over a two-day period) lists of the leading work-related diseases and injuries, based on their experience and their understanding of the available data. I asked them to select conditions according to three criteria: (1) the apparent frequency of the condition, (2) the severity of the condition in the individual case, (3) the "preventability" of the condition.

[1] Millar, Dr J. Donald. Letter to the editor. Journal of Occupational Medicine. Vol. 26, No. 5 (May 1984). p 340.

Dr. J. Donald Miller
continued

"The lists that emerged from the two subgroups were similar and were readily merged into a mutually acceptable consensus. For several months thereafter, we explored available data and among several possible etiologic factors; the available data were generally inadequate to quantify the *exclusive* contribution of occupation to the condition. Nonetheless, we judged the available information sufficient to warrant including each of the listed conditions. The process of producing the suggested list, convinced us that a very important use of such a list would be to guide the epidemiologic inquiry necessary to determine the relationship of occupation to the listed conditions.

"When we published the suggested list of "The Ten Leading Work-Related Diseases and Injuries", we specified our purposes in publishing it: "(1) to encourage deliberation and debate among professionals about the major problems in this field of public health, (2) to assist in setting National priorities for efforts to prevent health problems related to work, and (3) to convey to a diverse audience the concerns of the leadership of NIOSH and the focus of the Institute's activities.

"Inside NIOSH we have used the list as a guide in setting our priorities for epidemiologic investigations and other research. We are also using the list to guide preliminary development of proposed strategies for preventing these problems.

"It should be clearly understood that the presence of a disease or injury on the suggested list of the Ten Leading Work-Related Diseases and Injuries does not imply that occupation is the sole, nor even the major, causative factor. For example, in the causation of coronary artery disease, health behaviours (such as smoking, diet, amount of excercise, etc.), and inherited "proclivity" to develop coronary diseases, appear to be the major risk factors. These conditions are included in the *cardiovascular diseases* category of the NIOSH suggested list of The Ten Leading Work-Related Diseases and Injuries, because occupation is widely viewed as a possible etiologic risk factor. The sheer magnitude of coronary artery disease in the American population, and the fact that so many Americans work, demands that suggested occupational risk factors be thoroughly evaluated and either confirmed or rejected. The same may be said about the psychologic *disorders*, where causation is perhaps even more complex and certainly less well understood. Within the context of our reasons for having developed the list, and our uses of it as a guide for planning research and prevention, our inclusion of these conditions seems appropriate. Indeed, to have excluded them from the list would, in my opinion, have been irresponsible.

"Criticisms of the list have generally been of two types: (1) that existing data are inadequate to confirm an occupational role in

Dr. J. Donald Miller
continued

the causation of these conditions; and (2) that the list lends improper credence to the arguments of attorneys seeking compensation awards or other financial benefits for workers with these conditions.

"To those who proclaim inadequacy of the data, we must say that we agree. The data are clearly inadequate to define, to the satisfaction of any serious scientist, the role of occupation in *cardiovascular diseases* and *psychologic disorders.*

"To those who criticize the use of the list in legal proceedings, I can only answer that it was never our intention that the list be used for such purposes.

"Later this year, NIOSH will sponsor and convene a National Symposium on the Suggest List of The Ten Leading Work-Related Diseases and Injuries. This National Symposium will provide a forum for discussing the strengths and weaknesses of the list, and any necessary changes in it. It will also provide an opportunity to review proposed national strategies for controlling the first five categories. We encourage active formal participation in the Symposium by the occupational medical community and other interested groups, as we continue our efforts to define the problems that most threaten the health and safety of America's workers."

Appendix 3

Occupational Health and Safety Strategy from a Government Perspective

An example of the way governments present strategy in OHS was to be seen when the then Labour Minister, André Ouellet, tabled in the House of Commons major amendments to the Canada Labour Code. The proposed Part IV amendments concerned occupational safety and health, an area (according to the press release announcing the amendments) of considerable concern to workers, employers and the Canadian economy, as occupational illness and injury account for twice the number of working days lost in Canada as from strikes and lockouts.[1]

"The government believes that improved health and safety practices can alleviate this situation if employers and employees work together to eliminate hazards before they cause death or injury," said the Minister. The new amendments will require joint health and safety committees in all workplaces with over 20 employees. In small establishments employees would select a safety representative with much the same responsibility as the committees.

"A further, major concern of the government is that all employees in the federal jurisdiction should enjoy equal occupational safety and health rights," the Minister said. "To meet this

[1] Press Release, Labour Canada, May 15, 1984.

Occupational Health and Safety Strategy *continued*

need, the Bill will extend equal rights for occupational safety and health to all employees in the federal jurisdiction, including the federal public service under the aegis of the Financial Administration Act. This means that some 300,000 more workers will now be protected by Part IV. This protection will also include employees on ships, aircraft and trains, those operating inter-provincial pipelines and those drilling for oil and gas off our coastlines and in the North. I should add that existing procedures for ensuring public safety will not be affected. ''

The amendments also called for an industry council of labour and employers' representatives to advise the Minister on government policy, administration and legislation concerning occupational safety and health.

Appendix 4

Current Occupational Health and Safety Research in Canada[2]

Research is essential for progress in occupational health and safety. New knowledge is constantly needed as new problems appear and existing ones take on new twists. By its very nature, research is never sufficiently funded; good use of existing funds and resources is important. Critics of research accuse it of self-propagation, irrelevance, and of possessing credibility problems.

We are only now starting to assemble a comprehensive picture of the preoccupations of the organizations which fund occupational health and safety research in Canada and, at present, we cannot be assured that funding is effective or making best use of available resources.

Occupational health and safety research in Canada is inevitably overshadowed by that in the US and, increasingly, the European Economic Communities. We suspect, though we cannot be sure, that the overshadowing is in magnitude of resources rather than intrinsic quality. Concerns about Canada's duplicating research elsewhere must, however, be balanced against Canadian needs for a cadre of skilled researchers and for solutions to Canadian occupational health and safety problems.

Existing research appears to emphasize the refinements of particular approaches to problem-seeking at the expense of solution-finding. In 1980, Hammond[2] analyzed the contents of the *Annals of Occupational Hygiene* in order to see where environmental control stood in relation to other topics in occupational hygiene. The data showed that, of the papers published in the Annals from August 1975 to December 1978, 40% dealt with monitoring; 24%, physical effects and epidemiology; 8.4%, personal protection; 7.8%, toxicology; 7.8%, environmental control; 5.4%, general; 4%, criteria;

[1] Based on a background paper presented to the Meeting of Ministers responsible for occupational health and safety, 1984 09 19

[2] Hammond, C F. Dust control concepts in chemical handling and weighing. Annals of Occupational Hygiene. Vol. 23, No. 1 (1980). p 95-109.

Current Occupational Health and Safety *continued*

2.4%, technology. He concluded that the then current state of occupational hygiene effort reflected more attention to the monitoring of conditions, to epidemiology, and to the physical effects of various conditions than to prevention. Perhaps prevention is understood and in need of application, not further study.

The list of sources of Canadian information in occupational health and safety[3] prepared by the Canadian Centre for Occupational Health and Safety identified 588 organizations which, because they were sources of information in occupational health and safety, could be involved in occupational health and safety research to some degree, whether by organizing it, carrying it out, participating in it, funding it, or calling for it.

In conjunction with this list, the Centre is building a data base of Canadian research. By way of a preliminary analysis of the data base, 88 Canadian organizations were identified and data were produced on 491 projects these organizations listed as occupational health and safety research. Of the 491, 58 (11.8%) were concerned with occupational safety; the remainder, either with occupational health or with subjects not apparently related to occupational health and safety. Of the 491, 50 (10%) were oriented towards solution of occupational health and safety problems. Of the 50, just 24 (4.8%) were concerned with occupational safety.

From those preliminary findings it seems that research in occupational health has taken priority over occupational safety, in contrast to the experience of workers' compensation in Canada, where claims for occupational accidents outnumber those for occupational diseases by a large margin. It also seems that research aimed at solutions to problems rather than identification of problems is more likely to be done in occupational safety. A tempting preliminary conclusion is that more emphasis on occupational safety research might lead to improvements in the workplace, improvements which could reduce the toll of accidents.

Perspectives and Observations

The following perspectives and observations are offered on occupational health and safety research in Canada.

Occupational health and safety research ought to be applied rather than fundamental.

Solution-finding should take precedence over problem-seeking, which would involve a change in the present directions of research.

[3] Gibson-MacDonald, N. Sources of Canadian information in occupational health and safety. Canadian Centre for Occupational Health and Safety. Hamilton, Ont. : CCOHS, 1983

Perspectives and Observations
continued

Existing scientific knowledge pertaining to occupational health and safety is not yet fully applied. The separation between creation of new knowledge and application of existing knowledge should not be allowed to get too wide. Otherwise research, especially when it runs under its own impetus, risks becoming too narrow and too deep at the expense of problems of importance which become neglected. Research which should be supported and promoted fills gaps in knowledge revealed when governments, employers, and labour attempt to make use of information and do not find what they need.

There is a need to know when research has gone far enough because research properly pursues proof and details, sometimes to degrees which are not necessary for the purposes of prevention.

It seems that research in occupational health has taken priority over occupational safety, but it remains unclear whether this is a good balance, what the priorities are within these two areas, how these priorities are determined, and how they should be determined.

Statistics of occupational health and safety in Canada might be valuable in setting priorities for occupational health and safety research, but they do not serve this purpose at all well.

In some jurisdictions, research has an element of tripartite control, a worthwhile experiment which might well be extended to other collective approaches to the use of research in solving Canadian occupational health and safety problems.

Quality assurance is an important way for governments, employers, and labour, as well as the public to be assured that scientific research is trustworthy and appropriate .

Canada definitely needs a cadre of skilled researchers but they should have sufficient understanding of occupational health and safety issues, as well as of their particular scientific/technical specialties, if their research skills are to be used to the full.

Some areas of research, such as occupational epidemiology, appear to have reached a stage of declining returns, whereas others, such as accident research, organization of work, and design of workplaces and jobs, appear to be promising for development.

Research scientists, especially at conferences, appear to concentrate their attention on discussing methods, leaving critics room to question whether research is meeting perceived needs. Yet critics have so far been unable to define widely acceptable means for identifying such needs, and for saying whose needs should be given first priority.

Examples of Research of the Nature Recommended for Consideration by Ministers

Research can be considered under three headings: research of wide national importance, research oriented towards solutions, and research to remedy information gaps. Examples are given of two projects in each of the three categories.

Research of Wide Importance in Canada

Research Into the Data of Occupational Health and Safety

Data do exist on deaths, injuries, and illnesses attributable to work, in whole or in part, but these do not readily lend themselves to evaluation and analysis for purposes such as strategic planning of prevention by government, employers, or labour. It is not clear how such data should be collected so that they can be used to guide governments in legislating, determining policies, establishing priorities, allocating resources, and funding research. Research is required in order to describe in the necessary detail the existing pattern in Canada of occupationally related death, injury, and disease, and to recommend data collection systems which will effectively serve needs of governments, employers, and labour.

A Survey of Canadian Research Effort

A survey is needed of research itself so that governments, employers, and labour have a comprehensive picture of the occupational health and safety research effort in Canada. A possible model is *Industrial Research and Development Statistics*, produced by Statistics Canada annually, giving detailed statistics on industrial research and development activities in Canada.

Research Oriented Towards Solutions

Research into Accident Prevention by Design

Accidents should be prevented by appropriate design and use of plant, process, and equipment. Research is needed into the degree to which equipment manufactured in or imported into Canada is safe by design. Such research might be conducted separately in the various employment sectors such as construction, mining, and agriculture, with a view to determining the scope for possibilities for improvements in design in each of these sectors.

Research into Health Hazard Control

Prospects of medical cure, in any meaningful sense, remain remote for the bulk of occupational diseases. Prevention comes from eliminating or minimizing the contamination of workplaces by harmful chemicals or energies; this is what is meant by hazard control. Governments, employers, and labour are inhibited in their actions on hazard control by fear of the huge cost that would result if every industry were required to meet extremely strict control limits. Solution-oriented research projects, in the various employment sectors, would identify possibilities for hazard control at non-prohibitive cost in existing workplaces and in those undergoing refurbishment and reequipment.

Research to Fill Information Gaps

Research Into Violence at Work

The Centre has recently been asked by several independent inquirers to provide information on violence at work. Our review of current research and published studies, in Canada and elsewhere, revealed little information of immediate usefulness to inquirers. Violence at work is a concern to police officers, customs officials, taxi drivers, and other groups who are involved in public service. The Centre is now aware of this information gap and how it could be filled by specific research on reliable statistics, causal relations, and methods of prevention and protection.

Research Into Individual Perception of Chemical Risk

Risk assessment and hazard analysis provide scientific data for use by governments, employers, and organized labour in their facing risks, including risks from chemicals. A high proportion of inquiries coming to the Centre concerns chemicals. Responding to these inquiries shows us that the usual scientific approach to risk assessment is not sufficient or necessarily appropriate for individual managers or workers coping with chemicals and that new approaches are needed if individuals, and not just organizations, are to be assisted in their facing risks. The Centre is now aware of this information gap, and of the points of departure which research could appropriately take.

Appendix 5

Secondary School

The German chemist Wilhelm Ostwald (1853-1932) should be credited with being the first to recognize the need for something like secondary research based on systematic methods of handling scientific information. According to Bonitz[1], Ostwald was familiar with the information explosion, writing in 1910 that every day brings us evidence that a new paper ocean has been discovered, and that the problem is how to assist man to swim in it; in 1919, that all the publications on chemistry occuring in a year alone would amount to a volume of enormous dimensions, containing tens or even hundreds of thousands of papers. Ostwald proposed the principle of automatic parts of the whole in which scientific facts could be represented, not as a one-dimensional series, but as a network of complex links, indicating that a single fact relates not only to its antecedents and successors, but also to many other facts and factors. Ostwald felt the need to fragment scientific communications into small components which could then be reassembled in any combination, as dictated by the needs of advancing knowledge. Only in recent years has the advent of the computer made it possible to exploit Ostwald's ideas, though the problems recognized have multiplied throughout science. Occupational health and safety is probably in the state which Ostwald was describing in the first two decades of the twentieth century.

[1] M Bonitz, Wissenschaftliche Forschung und wissenschaftliche Information, Beitrage zur Forschungstechnologie, Akademie-Verlag, Berlin (in preparation).

Secondary Research *continued*

In 1949, the Committee on Physical Agents Reporting to the Panel on Environmental Hygiene of the Ninth Annual Congress on Industrial Health[2] felt that:

> The starting point of a report on physical agents which are potentially hazardous to health should be a summarization of the vast body of information as it relates to industrial applications. By this approach, it is believed, those areas in which further elaboration is indicated would become evident.

And, further on[3]:

> The need for distributing in a simplified and accurate manner the tremendous amount of information already available in these fields is of paramount importance. The gap which lies between the research laboratory and the industrial health personnel who apply it in the field must be bridged through efforts of all responsible agencies.
>
> There exist many areas where knowledge is inadequate. Despite evident deficiencies, however, the Committee feels that the hazards involved in these agents can be controlled by proper application of present information.

Ostwald's observations and these statements, made nearly 40 years ago, define the activity now known as secondary research. The extravagant growth in information since has not been matched by a growth in secondary research which, as a result, becomes more of a priority than it ever was. To judge from the inquiries coming to the Centre, practitioners, administrators, researchers and even university faculty are unable to cope with the demands which the need for secondary research places upon them. The bulk of the effort of the recent Ontario Royal Commission on Asbestos was devoted to secondary research, an experience indicative of the complexity, scope, and importance of secondary research.

The methods of secondary research are no less rigorous than those of primary. Though the methods are still underdeveloped, it is already clear that secondary researchers require sound and detailed understandings of the subject, skills and knowledge in information science, and access to comprehensive computer data base systems. The principles governing the Centre's code of conduct for scientific freedom and scientific quality assurance flow from the scientific requirements for secondary research:

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[2] Report of the panel on Environmental Hygiene: report of the Committee on Physical Agents. Archives of Industrial Hygiene and Occupational Medicine. Vol. 1, no. 6, p 610 (1950).

[3] Ibid, p 613

Secondary Research *continued*

The essential function of secondary research is to provide a secure knowledge base for opening up new research frontiers, for defining knowledge for practical application, and for handling controversy.

Secondary research is an unfortunate title because it conveys second best, which is not at all the case. In OHS, secondary research outstrips animal toxicology testing, epidemiology, and hygiene field work in its requirements for intellectual skill, scientific knowledge, and unbiased judgement, as well as reasoning, expression, and analysis.

Inadequacies in secondary research are a potent source of pitfalls for scientists and those who rely on scientific knowledge; for example, the overburden of publications in science, including OHS, encourages researchers to rely on the abstracts rather than the full text of the scientific publications.

Secondary research involves facts, their relations, their verification and their validation; handling ideas; interpreting experience; searching out truths and explaining them; piecing the explanations together into theories; working with patterns and bias; and allowing for systems of belief and thinking. All this is done not just with one study in hand, but with all the studies available, and done with the requisite standards of evidence, cogency, and probability (not only in the statistical sense). Second order theorizing, a crucial activity in the basic sciences, is an activity of secondary research.

Appendix 6 — The Future of Occupational Health

The real future of occupational medicine, according to Dr Craig Wright, Corporate Medical Director, Xerox, lies in health promotion as part of a preventive program in industry. A genuine commitment to health promotion involves the entire corporate culture which includes the environment, values and norms of a company.

Present and future tasks for occupational physicians involve employee assistance programs in drugs and alcohol, emotional stresses related to parent-child problems, spouse abuse, child mistreatment, marital, legal and financial distress, below the level at which psychiatric care is needed. In the past, nothing has been done for employees facing the emotional stress of divorce or suicide of their dependents.

Robots will reduce the number of employees in mid zone jobs. Remaining employees will strive for their own security and shortened work weeks to preserve jobs. If this shortening is achieved, new problems will emerge from increased leisure time and idleness.

[1] Wright, C C. Wright calls health promotion the future of occupational medicine. American Health Conference in the Annual C O Sappington Memorial Lecture. Occupational Health and Safety Letter. (May, 22 1984). p 4-5.

The Future of Occupational Health *continued*

American workers are becoming increasingly unhappy in their employment. Workers appear satisfied with the work they are doing in their jobs, but are dissatisfied with their companies because companies are downsizing, and job security and organizational stability are threatened. The most important threats to health are not chemical and workplace hazards, but those of job security and organizational security.

TABLE 1a

Ontario: Number of Compensation Claims with Cost by Nature of Injury

Nature of Injury	1982	1983	1984
Dermatitis	1,048	998	1,013
Silicosis	197	159	139
Other Industrial Diseases	9,680	9,994	11,239
Traumatic Injuries	264,221	265,026	292,698
Others (Personal Damage, etc.)	91	95	70
Not Coded	16,482	19,419	18,630
TOTAL	291,719	295,691	323,789

TABLE 1b

Ontario: Compensation Claims with Costs by Nature of Injury-Benefits Paid Out

Nature of Injury	1982	1983	1984
Dermatitis	$ 1,566,327	$ 2,193,087	$ 1,941,788
Silicosis	1,418,033	1,287,334	669,450
Other Industrial Diseases	29,335,178	31,880,656	36,305,690
Traumatic Injuries	696,532,255	768,749,417	902,143,058
Others (Personal Damage, etc.)	126,455	76,037	420,712
Not Coded	37,881,341	49,005,513	65,815,757
TOTAL	$749,859,589	$853,192,044	$1,007,296,455

TABLE 1c

Costs of Governments Activities
in OHS, through the Ministry of Labour,
excluding Compensation Boards and their Activities

	Actual 1982/83	Actual 1983/84	Actual 1984/85
		$ Millions	
Ontario Ministry of Labour	71.3	68.6	71.0
OHS Division	34.9	35.2	36.8
Program Administration (includes Standards & Programs Branch)	5.6	.4	5.6
Occupational Health Branch	8.6	8.6	8.7
Special Studies and Services Branch	3.4	3.4	3.7
Construction Health and Safety Branch (1 Director, 103 Inspectors and 13 Support Staff)	4.9	4.6	4.8
Industrial Health and Safety Branch (1 Director, 167 Inspectors and 16 Support Staff)	7.8	7.7	7.8
Mines Health and Safety Branch (1 Director, 77 Officers and Engineering Support, 14 Support Staff, including Mines Rescue)	4.0	4.0	4.3
Mines Rescue	0.7	0.7	0.9

TABLE 1d

Operating Statistics OSH Regulatory Agency Operations 1984 - 85 Federal-Provincial

	LAB CAN[9]	NFLD	NS	PEI	NB	QUE	ONT	MAN	SASK	ALTA	BC
Jurisdictions											
Operating Costs ($000) (Excl'g Salaries)	2300	700	421	54	1000	9550[8]	9100	680	1000	2400	2520
Operating Staff (Person-Years)	149	40	29	4	46	610	726	68	42	224[3]	198[4]
1000's of Establishments (Served)	34	1	12	2.2	12	182	172	21	36	63[2]	140[5]
Operating Staff per 1000 Establishments	4.34	4.0	2.4	1.8	3.8	3.4	4.2	3.2	1.2	3.6	1.4
1,000's of Workers (Covered)	844	140	227	22	250	2009	3400	520	450[1]	830	1300[6]
Operating Cost ($) per Worker	2.73	5.00	1.85	2.45	4.00	4.75	2.67	1.31	2.22	2.89	1.94
Operating Staff per 1000 Workers	0.18	0.29	0.13	0.18	0.18	0.30	0.21	0.13	0.09	0.27	0.15

NOTE

1 (Sask), Includes 90,000 Agricultural Workers
2 (Alta), includes 53,000 Employers
3 (Alta), includes medical surveillance of workers for silicosis, pneumoconiosis, etc
4 (BC), includes medical surveillance of workers for silicosis, occupational hearing loss and and exposure to lead, mercury, berilium fluoride, cadmium
5 (BC), includes 6,000 registered farms
6 (BC), includes 10,000 agricultural workers
7 (Ont), includes $1,200 thousand of lottery funds for Ministry of Labour approved projects
8 (Que), includes funding for sector associations, etc
9 (LC), does not include any occupational health role for 250,000 public servants
10 These data were obtained by the CAALL-OSHC Technical Secretariat in a telephone survey. Order-of-magnitude accuracy was requested.
11 Table supplied by Labour Canada.

TABLE 1e

Person-Years and Costs, OHS Regulatory Agencies

	LAB CAN[2]	NFLD	NS	PEI	NB	QUE	ONT	MAN	SASK	ALTA	BC	TOTAL
Operating Staff (Person-Years)	149	40	29	4	46	610	726	68	42	224	198	2136
Operating Staff [1] Salaries ($000)	5066	1360	986	136	1564	20740	24684	2312	1428	7616	6732	72624
Operating Costs ($000)	2300	700	421	54	1000	9550	9100	680	1000	2400	2520	29725
TOTAL COSTS ($000)	7366	2060	1407	190	2564	30290	33784	2992	2428	10016	9252	102349

NOTE

1 $34,000 taken as average salary cost per person-year

2 Table prepared by the Canadian Centre for Occupational Health and Safety

TABLE 2

Analysis of Strategies and Policies

Strategy/Policy	Chief Beneficiary	Type	Role of Info and Advice
Right to refuse	workers	proactive	essential
Right to know	workers	proactive	essential
Right to form joint committees	workers, managers	proactive	valuable
Support of internal responsibility system	workers, managers	proactive	valuable
Legislated permissible limits	professionals	proactive	essential
Environmental monitoring	professionals	proactive	essential
Biomedical surveillance	professionals	reactive	essential
Education	workers, managers, professionals	proactive	essential
Professional development	professionals	proactive	valuable
Research	scientific community	proactive	source

TABLE 3

The Number of Agencies Involved in,
and Laws Dealing with Occupational Health & Safety in Canada, 1982

Jurisdiction	No of Agencies Involved	No of Laws
Federal	13	25
Alberta	7	25
British Columbia	8	21
Manitoba	10	17
New Brunswick	7	14
Newfoundland	10	20
Nova Scotia	8	20
Ontario	9	20
Prince Edward Island	9	19
Québec	10	20
Saskatchewan	9	17
Northwest Territories	5	12
Yukon Territory	3	11
Total	108	241

TABLE 4

Occupational Health and Safety in Canada Departments and Legislation[1]

Jurisdiction	Main Departments	Acts Administered[2]	Secondary Departments	Acts Administered[2]
FEDERAL	Labour	Canada Labour Code (Part IV - Safety of Employees)	Agriculture	Pest Control Products Act
		Government Employees' Compensation Act	Consumer and Corporate Affairs	Hazardous Products Act
	Atomic Energy Control Board	Atomic Energy Control Act		
	Energy, Mines and Resources	Explosives Act Oil and Gas Production and Conservation Act		
	National Health and Welfare	Dept of National Health and Welfare Act Public Works Health Act Radiation Emitting Devices Act	Environment	Clean Air Act Environmental Contaminants Act
			Indian Affairs and Northern Development	Public Lands Grants Act
	Transport	Aeronautics Act Canada Shipping Act Motor Vehicle Safety Act Motor Vehicle Tire Safety Act Safe Containers Convention Act Transportation of Dangerous Goods Act	Public Works	Territorial Lands Act Financial Administration Act
			National Energy Board	National Energy Board Act
	Treasury Board	Financial Administration Act		
	Canadian Centre for Occupational Health and Safety	Canadian Centre for Occupational Health and Safety Act		
ALBERTA	Workers' Health, Safety and Compensation	Coal Mines Safety Act Occupational Health and Safety Act Quarries Regulation Act Radiation Protection Act Radiological Technicians Act (Part 2 and 3) Workers' Compensation Act	Environment	Agricultural Chemicals Act Clean Air Act Hazardous Chemicals Act
			Labour	Alberta Uniform Bldg Standards Act Boilers and Pressure Vessels Act Electrical Protection Act Elevator and Fixed Conveyances Act Employment Standards Act Fire Prevention Act Gas Protection Act Labour Relations Act Lightning Rod Act

Table 4
continued

Jurisdiction	Main Departments	Acts Administered[2]	Secondary Departments	Acts Administered[2]
ALBERTA *continued*			Municipal Affairs	Transportation of Dangerous Goods Control Act
			Transportation	Highway Traffic Act Motor Transport Act Off-Highway Vehicle Act
			Public Utilities Board	Railway Act
			Social Services and Community Health	Public Health Act
BRITISH COLUMBIA	Workers' Compensation Board	Workers' Compensation Act		
	Labour	Power Engineers and Boiler and Pressure Vessel Act Electrical Safety Act Factory Act Gas Safety Act Labour Code Labour Regulation Act	Attorney-General	Fire Services Act
			Environment	Pesticide Control Act Pollution Control Act
			Health	Health Act
			Municipal Affairs	Building Safety Standards Act Municipal Act
	Energy, Mines and Petroleum Resources	Coal Mine Regulation Act Mining Regulation Act Petroleum and Natural Gas Act	Transportation and Highways	Commercial Transport Act Highway (Industrial) Act Motor Carrier Act Pipeline Act Railway Act
MANITOBA	Northern Affairs and Environmental Development	Workplace Safety and Health Act	Agriculture	Pesticides and Fertilizers Control Act
			Consumer and Corporate Affairs and Environment	Clean Environment Act
			Health	Public Health Act
			Highway Traffic and Motor Transport Boards	Highway Traffic Act
			Labour and Manpower	Buildings and Mobile Homes Act Electricians' Licence Act Elevator Act Employment Standards Act Fires Prevention Act (Part II) Gas and Oil Burner Act Power Engineers Act Steam and Pressures Plants Act
	Energy and Mines	Mines Act		

Table 4
continued

Jurisdiction	Main Departments	Acts Administered[2]	Secondary Departments	Acts Administered[2]
MANITOBA *continued*			Manitoba Hydro-Electric Board	Manitoba Hydro Act
			Public Utilities Board	The Gas Pipe Line Act
			Workers' Compensation Board	Workers' Compensation Act
NEW BRUNSWICK	New Brunswick Occupational Health and Safety Commission	Occupational Health and Safety Commission Act Occupational Health and Safety Act	Environment	Clean Environment Act Pesticides Control Act
			Health	Health Act
			Labour and Manpower	Boiler and Pressure Vessel Act Electrical Installation and Inspection Act Elevators and Lifts Act Fire Prevention Act Plumbing and Installation and Inspection Act
			Municipal Affairs	Community Planning Act
			Transportation	Motor Carrier Act Motor Vehicle Act
			Workers' Compensation Board	Workers' Compensation Act
NEWFOUND-LAND	Labour and Manpower	Boiler and Pressure Vessel Act Elevators Act Occupational Health and Safety Act Radiation Health and Safety Act Regulation of Mines Act Amusement Rides Act Buildings Accessibility Act Forest Resources and	Attorney-General	Industrial Accidents Enquiries Act
			Board of Commissioners of Public Utilities	Motor Carrier Act
			Environment	Department of Consumer Affairs and Environment Act
			Logging Camps Act Lands	
			Mines and Energy	Petroleum and Natural Gas Act City of Corner Brook Act City of St John's Act Local Government Act, 1982
			Transportation	Highway Traffic Act Railways Act
			Provincial Fire Commissioner	Fire Prevention Act
			Workers' Compensation Board	Workers' Compensation Act

Table 4
continued

Jurisdiction	Main Departments	Acts Administered[2]	Secondary Departments	Acts Administered[2]
NOVA SCOTIA	Labour and Manpower	Construction Safety Act Electrical Installation and Inspection Act Elevators and Lifts Act Stationary Engineers Act Fire Prevention Act Industrial Safety Act Lightning Rod Act Steam Boiler and Pressure Vessel Act	Board of Commissioners of Public Utilities	Motor Carrier Act
			Environment	Environmental Protection Act Pest Control Products Act
	Health	Health Act Hospitals Act	Municipal Affairs	Building Code Act
			Transportation	Motor Vehicle Act
	Mines and Energy	Coal Mines Regulation Act Metalliferous Mines and Quarries Regulation Act Mineral Resources Act Petroleum & Natural Gas Act		
	Workers' Compensation Board	Workers' Compensation Act		
ONTARIO	Labour	Occupational Health and Safety Act	Consumer and Commercial Relations	Boilers and Pressure Vessels Act Building Code Act Elevating Devices Act Energy Act Gasoline Handling Act Ontario Water Resources Act Operating Engineers Act
	Workers' Compensation Board	Workers' Compensation Act		
			Energy	Power Corporation Act
			Environment	Environmental Protection Act
			Health	Public Health Act Public Hospitals Act
			Natural Resources	Petroleum Resources Act Woodmen's Employment Act
			Solicitor-General	Fire Marshals Act Lightning Rods Act
			Transportation and Communications	Highway Traffic Act Public Commercial Vehicles Act

Table 4
continued

Jurisdiction	Main Departments	Acts Administered[2]	Secondary Departments	Acts Administered[2]
PRINCE EDWARD ISLAND	Workers' Compensation Board	Construction Safety Act Workers' Compensation Act	Agriculture and Forestry	Agricultural Chemicals Act
	Occupational Health and Safety Council	Occupational Health and Safety Council Act	Community Affairs	Electrical Inspection Act Elevators and Lifts Act Environmental Protection Act Fire Prevention Act Lightning Rod Act
			Provincial Building	Code Act
			Health and Social Services	Hospitals Act Public Health Act
			Highway and Public Works	Dangerous Goods Transportation Act Highway Traffic Act Roads Act
			Labour	Power Engineers Act Steam Boilers Act
			Tourism, Industry and Energy	Oil and Natural Gas Act
			Public Utilities Commission	Motor Carrier Act
QUEBEC	Occupational Health and Safety Commission	An Act respecting occupational health and safety Workers' Compensation Act	Energy and Resources	Mining Act
			Environment	Environmental Quality Act
			Justice	An Act respecting explosives
			Labour, Manpower and Income Security	An Act respecting labour relations in the construction industry. An Act respecting electrical installations. Pipe Installations Act An Act respecting pressure vessels and other legislation Public Buildings Safety Act Stationary Engineer Act
			Municipal Affairs	Fire Prevention Act

Table 4
continued

Jurisdiction	Main Departments	Acts Administered[2]	Secondary Departments	Acts Administered[2]
QUEBEC *continued*			Social Affairs	An act respecting health services and social services Public Health Protection Act
			Transport	Highway Code Railway Act
			Transport Act	
			Electricity and Gas Board	Gas Distribution Act
			Human Rights Commissions	Charter of rights and freedom